

TCT@ACC-i2: Invasive and Interventional Cardiology

USE OF EX VIVO CRYOIMAGING AS AN ADJUVANT FOR PLAQUE VALIDATION BY OPTICAL COHERENCE TOMOGRAPHY AND FOR CHARACTERIZATION OF FIBROUS CAP INFLAMMATION IN ATHEROSCLEROTIC PLAQUES

Oral Contributions

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Background: We introduce a novel methodology for volumetric comparison of images from intravascular optical coherence tomography (OCT) versus cryoimaging and histology. We also evaluate the capacity of cryoimaging to characterize fibrous cap inflammation in atherosclerotic plaques.

Methods: Ten cadaveric coronaries were screened by OCT for fibroatheromatous and fibrous plaques. Cryoimaging and histology were then executed for each vessel (figure). Fibrous cap area and percent macrophage were measured from trichrome and antiCD68 slides. Fibrous caps were stratified into inflamed or non-inflamed groups based on two thresholds: 0% and 10% macrophage. Images from cryoimaging were split into single channels and intensity was measured over the pixel area of the cap. Univariate and multivariate logistic regression with stepwise selection were performed. Odds ratios (OR) and area under the receiver operating characteristic curves (AUC) were calculated.

Results: OCT accurately detected 81% (9 of 11) and 86% (6 of 7) of fibroatheromatous and fibrous plaques versus histology. Green fluorescence was the best marker of inflammation at 0% (OR=0.93, $p<0.05$) and 10% (OR=0.95, $p<0.05$) macrophage with AUC of 0.958 (95% CI=0.869-1.000, $p<0.001$) and 0.790 (95% CI=0.516-1.000, $p<0.05$), respectively.

Conclusions: Cryoimaging is a feasible adjuvant for volumetric validation of plaque characterization by OCT. Cryoimaging is able to accurately characterize fibrous cap inflammation in ex vivo human coronaries.

